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## Asymptotic Giant Branch Variables in NGC 6822

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**Abstract.** Using multi-epoch  $JHK_s$  photometry obtained with the 1.4-m Japanese-South African Infrared Survey Facility at Sutherland we have identified large numbers of AGB variables in NGC 6822. This paper uses 30 large amplitude variables, with periods ranging from about 200 to 900 days, to provide a new calibration for the period-luminosity relation.

### 1. Observations and the Mira Period-Luminosity Relation

This work is part of a large programme to examine AGB variable stars in Local Group galaxies. NGC 6822 is a Magellanic-type dwarf irregular with a central bar and an extended stellar halo; it is the nearest isolated dwarf galaxy in the Local Group.

The observations were made with the SIRIUS camera on the IRSF at SAAO. Three fields were used to cover a total area of  $7.5 \times 21.1$  arcmin<sup>2</sup> and 19 observations were made over a period of four years. Only a subset of the data has been analyzed in detail, from which we have identified 30 Mira variables with  $\Delta K > 0.4$  mag and 9 SR variables with lower amplitudes.

Fig. 1 shows the Miras and SRs on a period luminosity, PL( $K$ ), relation, where the absolute  $K$  mags were determined on the assumption that the distance modulus to NGC 6822 is 23.43 mag. It is clear that many of the Miras, particularly the redder and longer period ones, fall below the predicted PL( $K$ ) relation.

Fig. 2 shows the bolometric PL relation and compares it with that obtained for C-rich Miras in the LMC. The agreement is good, so we can understand the departure from the PL( $K$ ) as a consequence of circumstellar extinction.

### 2. Conclusion

Further work is required to fully characterize the other variables in NGC 6822 and to determine if they all are carbon-rich, as we assume here. This sample already provides a very good group with which to calibrate the Mira PL relation beyond the Magellanic Clouds. We anticipate a good deal of interest in this as the next generation of telescopes from the ground and from space start to image ever more distant individual stars in the infrared.

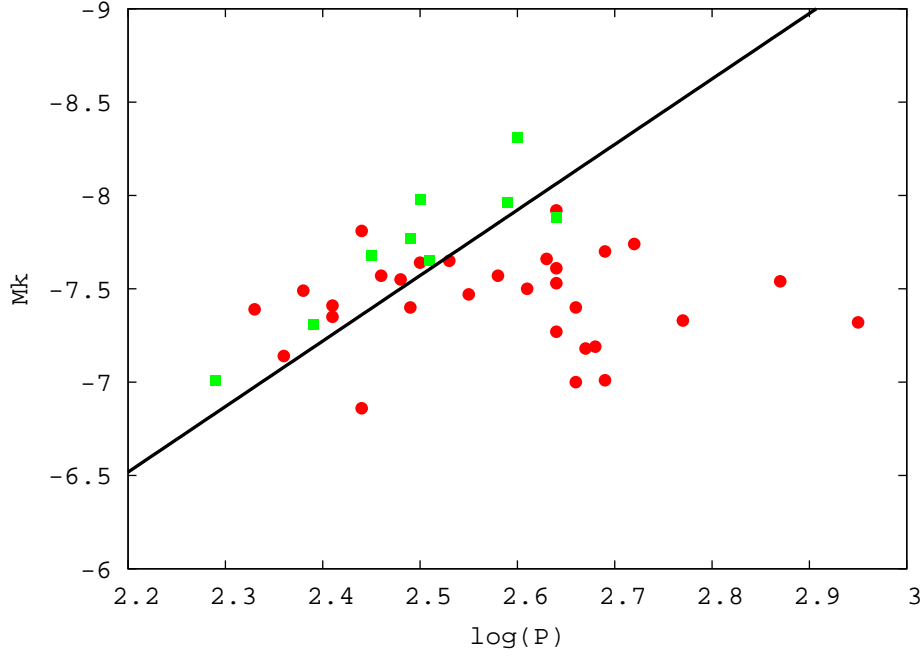


Figure 1. PL(K) relation for Miras (red circles) and SRs (green squares). The line shows the LMC PL(K) relation.

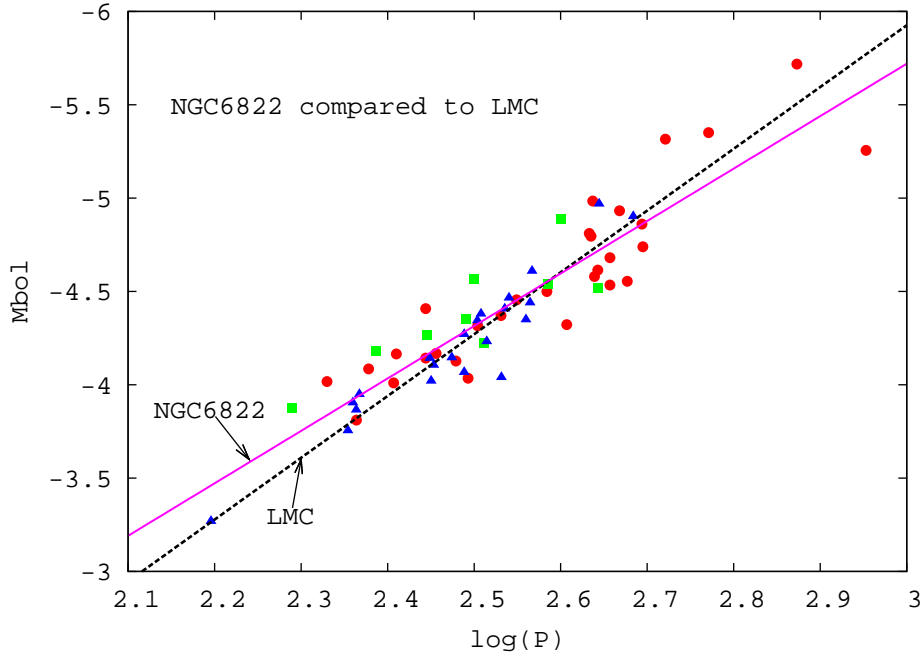


Figure 2. Bolometric PL relation comparing the Miras in NGC 6822 (red circles) with the C-rich Miras in the LMC (blue triangles); SR variables in NGC 6822 are also shown as green squares.